



NMDCAT

FULL LENGTH PAPER-5

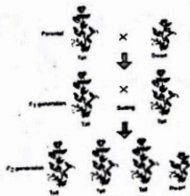
QUARTER SYLLABUS - 4

Total MCQs: 200

Max. Marks: 200

BIOLOGY

- Q.1** An allele is said to be dominant if:
 (a) It is expressed only in heterozygous combination
 (b) It is expressed in both homozygous and heterozygous condition
 (c) It is expressed only in homozygous combination
 (d) It is expressed only in second generation
- Q.2** Mendel's principle of segregation was based on the separation of alleles in the garden pea during:
 (a) Pollination
 (b) Embryonic development
 (c) Seed formation
 (d) Gamete formation
- Q.3** In Mendel's experiment, nature of seed coat, flower colour, position of flower, pod colour, stem height, etc., are referred to as:
 (a) Alleles
 (b) Genotypes
 (c) Phenotypes
 (d) Traits
- Q.4** A cross between a homozygous recessive and a heterozygous plant is called:
 (a) Monohybrid cross
 (b) Dihybrid cross
 (c) Test cross
 (d) Back cross
- Q.5** Law of segregation is based upon which phenomena?
 (a) Complete dominance
 (b) Codominance
 (c) Incomplete dominance
 (d) Over-dominance
- Q.6** Which of the following depicts the Mendel's dihybrid ratio?
 (a) 3 : 1
 (b) 9 : 7
 (c) 9 : 3 : 3 : 1
 (d) 15 : 1
- Q.7** In dihybrid cross, out of 16 plants obtained, the number of genotypes will be:
 (a) 4
 (b) 16
 (c) 9
 (d) 12
- Q.8** From a cross $Aa BB \times aa BB$, which of the following genotypic ratio will be obtained in F_1 generation?
 (a) 1 $Aa BB$: 1 $aa BB$
 (b) 1 $Aa BB$: 3 $aa BB$
 (c) 3 $Aa BB$: $aa BB$
 (d) All $Aa BB$: No $AA BB$
- Q.9** How many different types of genetically different gametes will be produced by a heterozygous plant having the genotype $AABbCc$?
 (a) 2
 (b) 6
 (c) 4
 (d) 9
- Q.10** The below diagram shows:



- (a) Monohybrid cross
 (b) Trihybrid cross
 (c) Dihybrid cross
 (d) Tetrahybrid cross
- Q.11** In hybridization, $Tt \times tt$ gives rise to the progeny of ratio:
 (a) 1 : 1
 (b) 2 : 1
 (c) 1 : 2
 (d) 1 : 2 : 1



- Q.12** Keeping in view the Mendel's law of segregation, if homozygous tall plants were crossed with short heighted plants, then which of the following best describe the F_1 progeny?
(a) Homozygous and tall heighted (b) Heterozygous and tall heighted
(c) Homozygous and short heighted (d) Heterozygous and short heighted
- Q.13** Mendel's law of independent assortment is applicable for:
(a) All genes in all organisms (b) All genes of pea plant only
(c) All linked genes only (d) All non-linked genes only
- Q.14** A human female with blood group 'A' has:
(a) Antibody-anti-B in the red blood cells and antigen A in the serum
(b) Antigen B on the red blood cells and antibody-anti-B in the serum
(c) Antigen A on the red blood cells and antibody-anti-B in the serum
(d) Antigen A on the red blood cells and antibody-anti-A in the serum
- Q.15** Physical association of two genes is known as:
(a) Heterozygosis (b) Linkage
(c) Recombination (d) Homozygosis
- Q.16** Which of the following is sex-linked recessive disorder?
(a) Myotonic dystrophy (b) Haemophilia
(c) Sickle-cell anaemia (d) Phenylketonuria
- Q.17** After an injury, haemophiliac's blood fails to clot properly because it may have:
(a) Reduction in blood clotting factors (b) Absence of blood clotting factors
(c) Malfunctioning of blood clotting factors (d) All A, B, C
- Q.18** Haemophilia 'A' occurs due to disturbance in _____ while haemophilia 'B' occurs due to disturbance in _____, respectively.
(a) Factor, IX, factor X (b) Factor XI, factor VIII
(c) Factor VIII, factor IX (d) Factor IX, factor XI
- Q.19** If a carrier hemophilic female is married to a hemophilic male, then what will be the probability of hemophilia in their offsprings?
(a) All females and males will be hemophilic
(b) Females and males both have 100% chances of getting hemophilia
(c) 25% carrier female, 25% hemophilic female, 25% normal male and 25% hemophilic male
(d) Females have 50% chances of getting hemophilia and males will be 100% hemophilic
- Q.20** Which of the following is true about haemophilia B?
(a) Equal chances in both male & female (b) More chances in female than male
(c) No chances in female at all (d) More chances in male than female
- Q.21** Which option is correct regarding the amino acids found in histone proteins?

	Amino acids	Nature	Charge
(a)	Aspartate and lysine	Basic	Negative
(b)	Arginine and lysine	Basic	Positive
(c)	Arginine and leucine	Acidic	Positive
(d)	Aspartate and leucine	Acidic	Negative

- Q.22** It is incorrect about euchromatin:
(a) Condensed only during cell division (b) Present in closed configuration
(c) More often transcribed (d) Commonly undergo genetic recombination
- Q.23** It is the basic unit of genetic information:
(a) DNA (b) Gene
(c) Genotype (d) Genome
- Q.24** The central dogma of life consists of two steps, which are _____ and _____, respectively.
(a) Replication, Transcription (b) Transcription, Translation
(c) Translation, Transcription (d) Replication, Reverse transcription
- Q.25** It is a dimeric enzyme:
(a) RNA polymerase (b) DNA polymerase II
(c) DNA polymerase I (d) DNA polymerase III
- Q.26** During synthesis of lagging strand, DNA polymerase jumps:
(a) Towards replication fork (b) Either towards or away from replication fork
(c) Away from replication fork (d) Does not jump in anyway



- Q.27** What is the correct sequence of enzymes related to DNA replication?
(a) Primase, helicase, ligase, DNA polymerase III (b) Primase, helicase, DNA polymerase III, ligase
(c) Helicase, primase, DNA polymerase III, ligase (d) DNA polymerase III, primase, ligase, helicase
- Q.28** The length of Okazaki fragments in eukaryotic cell is:
(a) 100-200 nucleotides (b) 300-600 nucleotides
(c) 1000-2000 nucleotides (d) 1200-1500 nucleotides
- Q.29** Which one is responsible for correct initiation of transcription?
(a) Transcription bubble (b) Core enzyme
(c) Sigma factor (d) RNA polymerase
- Q.30** Non-sense codons:
(a) Are not recognized by release factors (b) Are not found on mRNA
(c) Do not bind to tRNA (d) Can code for only one amino acid
- Q.31** Which type of molecule is the end product of translation?
(a) An amino acid (b) mRNA
(c) DNA (d) Polypeptide
- Q.32** A specific amino acid binds with tRNA at:
(a) Anticodon binding site (b) Free 5' phosphate end
(c) Free 3' hydroxyl end (d) Ribosome recognition site
- Q.33** Translocation of ribosome on mRNA occurs due to:
(a) Polymerase (b) Initiation factor
(c) Elongation factor (d) Release factor
- Q.34** Which process does not occur during the formation of mRNA?
(a) Condensation (b) Polymerization
(c) Replication (d) Transcription
- Q.35** Which is the site for translation in bacteria?
(a) Chloroplast (b) Ribosome
(c) Mitochondria (d) All A, B, C
- Q.36** Series of changes in the genetic composition of a population over time is called:
(a) Revolution (b) Population genetics
(c) Evolution (d) Succession
- Q.37** All of the following are related to evolution except:
(a) Change over time (b) Muscle hypertrophy
(c) Antibiotic resistance in bacteria (d) Origin of new species
- Q.38** Oldest known fossils are of:
(a) Fungi (b) Bacteria
(c) Algae (d) Plants
- Q.39** Wings of birds and insects are examples of _____ and show _____ evolution.
(a) Homologous, Divergent (b) Analogous, Divergent
(c) Homologous, Convergent (d) Analogous, Convergent
- Q.40** Which one of the following is considered as strong evidence of evolution?
(a) Embryology record (b) Biochemical record
(c) Molecular record (d) Fossil record
- Q.41** For evolution, the most important requirement is:
(a) Variations (b) Adaptations
(c) Genetic drift (d) Migration
- Q.42** Which one is according to Lamarckism?
(a) Variation → adaptations → inheritance (b) Recombination → variation → adaptations
(c) Adaptations → variation → inheritance (d) Mutations → variations → adaptations
- Q.43** According to Lamarck, extension of neck in giraffe was a result of:
(a) Mutation (b) Environmental changes
(c) Natural selection (d) Genetic drift
- Q.44** Arms, wings, flippers and forelegs of different mammals are variations on common anatomical theme present:
(a) Convergent evolution (b) Organic evolution
(c) Divergent evolution (d) Speciation



- Q.45** The DNA molecule synthesized by using reverse transcriptase is called:
(a) rDNA (b) Mutant DNA
(c) cDNA (d) Chimeric DNA
- Q.46** Which of the following is the source of restriction endonucleases?
(a) Bacteria (b) Algae
(c) Fungi (d) Animal-like protists
- Q.47** How many restriction endonucleases are frequently used in recombinant DNA technology?
(a) 400 (b) 80
(c) 250 (d) 20
- Q.48** The enzyme responsible for joining DNA molecules from at least two different sources is:
(a) DNA helicase (b) Restriction endonuclease
(c) DNA polymerase (d) DNA ligase
- Q.49** Which of the following virus can be used to transfer chimeric DNA into bacterial cell?
(a) Lambda phage (b) HIV
(c) T₄ phage (d) HCV
- Q.50** Restriction enzymes are molecular scissors used in genetic engineering to cut up DNA. In nature, where are these enzymes produced and for what purpose?
(a) In viruses; to splice host cell DNA
(b) In yeast cell; to defend against foreign DNA invasion
(c) In bacteria; to defend against viral invasion
(d) In viruses; to defend itself against mutation
- Q.51** A method used to detect a particular DNA sequence within a mixture of many DNA fragments is:
(a) DNA sequencing (b) DNA probing
(c) DNA fingerprinting (d) Gel electrophoresis
- Q.52** Phage mediated transfer of genetic material into a bacterium:
(a) Conjugation (b) Transduction
(c) Transformation (d) Transfection
- Q.53** In PCR, the maximum temperature is required for:
(a) Denaturation (b) Extension
(c) Annealing (d) DNA isolation from source
- Q.54** Disputed parentage is solved by using:
(a) PCR amplification (b) DNA fingerprinting
(c) DNA sequencing (d) Organismic cloning
- Q.55** Gene for the vascular endothelial growth factor is used in:
(a) Cystic fibrosis (b) Cancer therapy
(c) Coronary artery angioplasty (d) SCID treatment
- Q.56** Which of the following was the first eukaryotic organism whose genome was completely sequenced?
(a) *Drosophila melanogaster* (b) *Saccharomyces cerevisiae*
(c) *Arabidopsis thaliana* (d) *Haemophilus influenzae*
- Q.57** All of the following biotechnology products are produced by using transgenic bacteria except:
(a) Human growth hormone (b) Haemophilia factor VIII
(c) Tissue plasminogen activator (d) Hepatitis C vaccine
- Q.58** For genetic engineering of plant, tiny and self-sealing holes in the protoplast can be generated through:
(a) Mechanical shaking (b) Electric current
(c) By using chemicals (d) Treatment with various enzymes
- Q.59** Which one of the following is now being commercially produced by biotechnological procedures?
(a) Nicotine (b) Quinine
(c) Morphine
- Q.60** Polyhydroxy butyrate, bio-degradable plastic, can be produced by genetically engineered:
(a) Bacterial species (b) Fungal species
(c) Plants species (d) Weed species

CHEMISTRY

- Q.61** When phenol reacts with ethanoyl chloride in the presence of a base it forms _____
(a) Salt (b) Ester
(c) Ketone (d) Ether



- Q.62 The ethanol is distilled again and again to obtain 95% ethanol which is called
(a) Rectified spirit (b) Absolute alcohol
(c) Methylated spirit (d) Wood spirit
- Q.63 Which enzyme is used to convert glucose into ethanol
(a) Zymase (b) Invertase
(c) Diastase (d) Maltase
- Q.64 When phenol is treated with Y, the benzene is formed. What is Y
(a) Nickel (b) Alumina
(c) Zinc (d) Hydrogen
- Q.65 Which alcohol shows least reactivity with ZnCl_2 and HCl
(a) $(\text{CH}_3)_3\text{C}-\text{OH}$ (b) $\text{CH}_3-\text{CH}_2-\text{OH}$
(c) $(\text{CH}_3)_2\text{CH}-\text{OH}$ (d) All show same reactivity
- Q.66 When ethanol reacts with CH_3MgI , the product formed is
(a) C_2H_6 (b) CH_3CHO
(c) C_2H_4 (d) CH_4
- Q.67 Phenol reacts with methanal in the presence of acid or alkali to give _____
(a) o-Hydroxybenzyl alcohol (b) m-Hydroxybenzyl alcohol
(c) p-Hydroxybenzyl alcohol (d) Both a) and c)
- Q.68 If electrophile attacks on alcohols, which bond of alcohol will break
(a) $\text{C}-\text{O}$ (b) $\text{O}-\text{H}$
(c) $\text{C}-\text{H}$ (d) $\text{C}-\text{C}$
- Q.69 n-propyl alcohol and iso-propyl alcohol can be distinguished by
(a) Alkaline iodine (b) Tollen's reagent
(c) Lucas reagent (d) Both a) and c)
- Q.70 The colourless salt is formed when phenol reacts with
(a) H_2SO_4 (b) Na_2CO_3
(c) NaOH (d) Both b) and c)
- Q.71 Iso-Butyl alcohol has following carbon attached to hydroxyl group
(a) Tertiary (b) Primary
(c) Secondary (d) Quaternary
- Q.72 Legumin and collagen proteins are present in the connective tissues throughout the body. They are categorized under
(a) Conjugated proteins (b) Simple proteins
(c) Derived proteins (d) Compound proteins
- Q.73 The simple sequence of the amino acids combined in a peptide chain is referred to as the _____
(a) Secondary structure (b) Tertiary structure
(c) Primary structure (d) Quaternary structure
- Q.74 Haemoglobin is a
(a) Transport protein (b) Building protein
(c) Genetic protein (d) Structural protein
- Q.75 Collagen is a fibrous protein present most abundantly in
(a) Tendons (b) Arteries
(c) Hair (d) Nail
- Q.76 Which one of the followings is the main function of DNA?
(a) Making of proteins (b) Making of amino acids
(c) Breaking of ribose sugar (d) Carries genetic information
- Q.77 An organic compound Y when treated with NaBH_4 forms Z, which gives positive iodoform test. The compound Y is
(a) Ethanol (b) Methanal
(c) Ethanal (d) Propanal
- Q.78 Butanone on oxidation with $\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}_2\text{SO}_4$ forms
(a) Acetic acid and Ethane (b) Acetic acid only
(c) Methane and Propanoic acid (d) Propanoic acid and methanoic acid



- Q.79** Aldehydes and ketones react with ammonia derivative to form compounds containing imine functional group. This is an example of
(a) Substitution reaction (b) Elimination reaction
(c) Addition reaction (d) Addition-elimination reaction
- Q.80** Which one of the following compounds is difficult to oxidize?
(a) $\text{CH}_3\text{CH}_2\text{CHO}$ (b) $\text{C}_3\text{H}_7\text{OH}$
(c) CH_3CHO (d) CH_3COCH_3
- Q.81** Acetone and formaldehyde can be distinguished by means of
(a) Iodoform test (b) Tollen's test
(c) Sodium Nitroprusside test (d) All of these
- Q.82** In base catalyzed reaction of carbonyl compounds, the base increases
(a) Nucleophilic character of C of carbonyl (b) Acidic character of carbonyl
(c) Electrophilic character of carbonyl carbon (d) Nucleophilic character of the reagent
- Q.83** $\text{CH}_3\text{CO}-\text{CH}_2\text{CH}_2\text{CH}_3 + [\text{O}] \rightarrow \text{C} + \text{D}$, In the given reaction, C and D are
(a) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COOH}$ (b) $\text{CH}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{COOH}$
(c) $\text{CH}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{CHO}$ (d) $\text{HCHO} + 2\text{CH}_3\text{COOH}$
- Q.84** Which of the following statements is correct about acetaldehyde and acetone?
(a) Both give alcohols on reduction with NaBH_4
(b) Both give positive iodoform test
(c) Both react with 2, 4-Dinitrophenyl hydrazine reagent
(d) All of these
- Q.85** _____ when strongly heated with Fehling's reagent gives brick red precipitate of cuprous oxide
(a) Benzaldehyde (b) Propanal
(c) Propanol (d) Propanone
- Q.86** Which one of the following does not give Cannizzaro's reaction?
(a) Formaldehyde (b) Benzaldehyde
(c) Trimethylacetaldehyde (d) Acetaldehyde
- Q.87** Which of the following will react with both aldehydes and ketones?
(a) 2,4-DNPH (b) Tollen's reagent
(c) Fehling's reagent (d) Benedict's reagent
- Q.88** Acetaldehyde is prepared industrially by air oxidation of which of the following using palladium chloride catalyst with a cupric chloride promoter
(a) Ethane (b) Ethanoic acid
(c) Ethanol (d) Ethylene
- Q.89** _____ is prepared by dry distillation of calcium acetate
(a) Acetaldehyde (b) Butanone
(c) Formaldehyde (d) Acetone
- Q.90** Which of the following pair of compounds can be distinguished by iodoform test?
(a) Ethanal and Propanone (b) Acetone and 3-Pentanone
(c) Methanal and Propanal (d) 1-Propanol and Methanol
- Q.91** Ethanol reacts with acetaldehyde in presence of dry HCl to give
(a) Ethoxyethane (b) 1,1-Diethoxyethane
(c) 1,2-Diethoxyethane (d) 1,1-Diethoxypropane
- Q.92** 3° alkyl halides give the reaction through
(a) $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ (b) E_1 and E_2
(c) $\text{S}_\text{N}1$ and E_1 (d) $\text{S}_\text{N}2$ and E_2
- Q.93** Which of the following is an electrophile?
(a) H_2O (b) NH_3
(c) PH_4^+ (d) SO_3
- Q.94** _____ is a single step mechanism
(a) $\text{S}_\text{N}2$ and E_2 (b) $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$
(c) E_1 and E_2 (d) $\text{S}_\text{N}1$ and E_1
- Q.95** The mechanism involved in the reaction, $\text{NH}_3 + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C}_2\text{H}_5\text{NH}_2 + \text{HBr}$, is
(a) $\text{S}_\text{N}1$ (b) $\text{S}_\text{N}2$
(c) E_1 (d) E_2



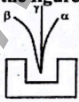
- Q.96 Which of the following is a weaker nucleophile?
(a) Cl^- (b) Br^-
(c) F^- (d) I^-
- Q.97 In $\text{S}_\text{N}2$ reaction the percentage of retention and inversion of configuration in the product is
(a) 0% and 100% (b) 100% and 0%
(c) 75% and 25% (d) 50% and 50%
- Q.98 $\text{C}_2\text{H}_5\text{Cl}$ reacts with alcoholic CN^- to produce
(a) $\text{H}_2\text{O} + \text{HCN}$ (b) $\text{C}_2\text{H}_5\text{CN}$
(c) C_2H_4 (d) $\text{C}_3\text{H}_7\text{CN}$
- Q.99 The order of a typical $\text{S}_\text{N}2$ reaction is
(a) 1st (b) 2nd
(c) Zero (d) Pseudo 1st
- Q.100 The alkyl halide molecule on which a nucleophile attacks is known as
(a) Neutral electrophile (b) Attacking nucleophile
(c) Leaving nucleophile (d) Substrate molecule
- Q.101 The rate of E_2 reaction depends upon concentration of
(a) Substrate molecule (b) Nucleophile only
(c) Substrate as well as base (d) Leaving group only
- Q.102 Which of the following is strongest bond?
(a) C - Cl (b) C - F
(c) C - Br (d) C - I
- Q.103 Reaction of tertiary alkyl halide with KCN in the presence of alcohol is
(a) Nucleophilic Substitution (b) β -elimination
(c) Nucleophilic addition (d) Electrophilic substitution
- Q.104 Which of the following is a fatty acid?
(a) Adipic acid (b) Oxalic acid
(c) Benzoic acid (d) Butanoic acid
- Q.105 The reaction of acetic acid with SOCl_2 is _____ reaction
(a) Nucleophilic addition (b) Electrophilic substitution
(c) Addition-elimination (d) Nucleophilic substitution
- Q.106 If ethyl butyrate is added to a liquid, it will develop a flavor of
(a) Banana (b) Pineapple
(c) Jasmine (d) Apricot
- Q.107 Acetic anhydride is a product of acetic acid, as a result of following reaction
(a) Reduction (b) Oxidation
(c) Dehydration (d) Esterification
- Q.108 Which one is weakly acidic in nature
(a) Propanoic acid (b) Butyric acid
(c) Acetic acid (d) Formic acid
- Q.109 Acetic acid react with ammonia to form ammonium acetate which on heating produce ____
(a) Ethyl amine (b) Acetic anhydride
(c) Ethane nitrile (d) Acetamide
- Q.110 When acetic acid is heated with ethanol in the presence of concentrated H_2SO_4 , _____ is formed
(a) Acetamide (b) Ethyl acetate
(c) Methyl propanoate (d) Ethyl formate
- Q.111 Ethanoic acid reacts with sodium metal to form _____ and _____
(a) Salt, Hydrogen gas (b) Salt, Carbon dioxide
(c) Salt, Water (d) Salt, base
- Q.112 The number of peptide bonds present in a tetrapeptide
(a) One (b) Three
(c) Two (d) Zero
- Q.113 Carboxylic acids on reaction with lithium aluminium hydride (LiAlH_4) are reduced to
(a) Alkanes (b) Primary alcohols
(c) Secondary alcohols (d) Tertiary alcohols

- Q.114 Which of the following enzyme is raised in rickets?
 (a) Lactic dehydrogenase (b) Alkaline phosphatase ✓
 (c) LDH-1 (d) Phosphatase
- Q.115 Urea undergoes hydrolysis into NH_3 and CO_2 in the presence of enzyme ____ present in soybean
 (a) Invertase (b) Zymase
 (c) Urease (d) Diastase
- Q.116 Which of the following derivative of ethanoic acid is least reactive?
 (a) Ethyl acetate (b) Acetamide
 (c) Acetic anhydride (d) Acetyl chloride
- Q.117 Identify the product which is formed by reversible reaction
 (a) CH_3COCl (b) $\text{CH}_3\text{COOC}_2\text{H}_5$
 (c) $(\text{CH}_3\text{CO})_2\text{O}$ (d) CH_3CONH_2
- Q.118 $\text{CH}_3-\text{CO}-\text{NH}_2 \xrightarrow[\text{Ether}]{\text{LiAlH}_4} \text{Y} + \text{H}_2\text{O}$, what is "Y" in given reaction
 (a) Ethanoic acid (b) Ethanol
 (c) Ethanenitrile (d) Ethylamine
- Q.119 What are "X" and "Y" in the given reaction (ii)
 (i) $\text{CH}_3-\text{COOC}_2\text{H}_5 \longrightarrow \text{CH}_3-\text{COONa} + \text{C}_2\text{H}_5-\text{OH}$
 (ii) $\text{CH}_3\text{COONa} + \text{HCl} \longrightarrow \text{X} + \text{Y}$
 (a) $\text{X} = \text{CH}_3\text{CH}_2\text{OH}$ (b) $\text{X} = \text{CH}_3\text{COOH}$
 $\text{Y} = \text{NaCl}$ (c) $\text{Y} = \text{NaCl}$
 $\text{X} = \text{CH}_3\text{CHO}$ (d) $\text{X} = \text{CH}_3\text{COOH}$
 $\text{Y} = \text{C}_2\text{H}_5\text{OH}$ (e) $\text{Y} = \text{C}_2\text{H}_5\text{OH}$
- Q.120 Grignard's reagent gives carboxylic acid with
 (a) HCHO (b) CH_3COCH_3
 (c) CH_3CHO (d) CO_2

PHYSICS

- Q.121 Which of the following series have more energetic photons?
 (a) Lyman series (b) Paschen series
 (c) Balmer series (d) Pfund series
- Q.122 Paschen series and Pfund series photon differ by
 (a) Wavelength (b) Nature
 (c) Speed (d) all of these
- Q.123 Photon of which has least momentum
 (a) Radio wave (b) Ultraviolet light
 (c) Infrared wave (d) γ -rays
- Q.124 Peak value of alternating input signal in bridge rectifier circuit is 2 V, the rms value of output rippled signal will be
 (a) 2 V (b) 1 V
 (c) $\sqrt{2}$ V (d) 0 V
- Q.125 With the emission of β -positive an elementary particle is also emitted by nucleus which is named as
 (a) Meson (b) Boson
 (c) Neutrino (d) Meon
- Q.126 Unidirectional property of p.n junction diode is used in
 (a) Rectifier (b) Amplifier
 (c) Transistor (d) Oscillator.
- Q.127 The velocity of Balmer series photon is equal to that of
 (a) Cathode rays (b) α -rays
 (c) Light (d) Sound



- Q.128 3.8 days is the half-life period of a sample. After how many days, the sample will become 1/8th of the original substance?
(a) 11.4 (b) 3.8
(c) 3 (d) None of these
- Q.129 A natural nuclear phenomenon which is not affected by any physical or chemical change is called
(a) Nuclear reaction (b) Fusion
(c) Fission (d) Radioactivity
- Q.130 Which one has highest penetration power other than nuclear radiations.
(a) α -radiations (b) γ -radiations
(c) β -radiations (d) neutrons
- Q.131 During half wave rectification frequency
(a) is halved (b) is doubled
(c) is quadrupled (d) remains same
- Q.132 If half-life of a radioactive sample were $T_{1/2}$ then its decay constant will be
(a) $\frac{T_{1/2}}{0.693}$ (b) $\frac{T_{1/2}}{\log_e 2}$
(c) $\frac{0.693}{T_{1/2}}$ (d) Both A and C
- Q.133 To have photon of longest wavelength in Paschen series, transition of electron should be
(a) Infinity to 3rd orbit (b) 4th to 3rd orbit
(c) 4th to 1st orbit (d) 5th to 3rd orbit
- Q.134 Which of the following interaction is possible with Pfund series photon?
(a) Compton electron (b) Photoelectric effect
(c) Pair production (d) All of the above
- Q.135 A man of 100 kg absorbs energy 1000J from radiations. The absorbed dose in Gy is
(a) 100 (b) 10
(c) 0.1 (d) 0.01
- Q.136 In a radioactive phenomenon observation shown in figure where α -deviates lesser than β in some electric or magnetic field (not shown in the figure). What is the reason of less deviation of α ?

(a) α is charged particle (b) α is neutral particle
(c) α is heavier particle (d) α is lighter particle
- Q.137 Half-life of radium is 1620 years. In how many years shall the earth loss all its radium due to radioactive decay?
(a) 1590×10^6 years (b) 1590×10^{12} years
(c) 1590×10^{24} years (d) Never
- Q.138 Initial mass of a radioactive substance was 400 mg. Half-life = 100s. How much will be left after 300s?
(a) 50 mg (b) 33.33 mg
(c) 100 mg (d) 200 mg
- Q.139 During negative half cycle of A.C then P-n Junction offers
(a) High resistance (b) No resistance
(c) Low resistance (d) All of these
- Q.140 Paschen series is obtained when all the transitions of electron terminate on.
(a) 2nd orbit (b) 3rd orbit
(c) 4th orbit (d) 5th orbit



Q.141 The uranium nucleus ${}^{238}_{92}\text{U}$ undergoes α -decay, producing nucleus X.

Nucleus X undergoes β -decay, producing nucleus Y.

For nucleus Y, what are the values of the proton number and nucleon number?

	proton number	nucleon number
(a)	89	234
(b)	89	236
(c)	91	234
(d)	91	236

Q.142 The nucleus ${}^{234}_{92}\text{X}$ emits 3- α particles and then one β -particle. The end product will be

(a) ${}^{222}_{84}\text{Y}$

(b) ${}^{228}_{87}\text{Y}$

(c) ${}^{228}_{84}\text{Y}$

(d) ${}^{222}_{87}\text{Y}$

Q.143 The particle emitted in the nuclear reaction ${}_Z\text{X}^A = {}_{Z+1}\text{Y}^A + \dots$ will be

(a) α -particle

(b) β -particle

(c) β^+ particle

(d) Photon

Q.144 The momentum of an electron of wavelength 100 \AA is

(a) $6.6 \times 10^{-26} \text{ kg ms}^{-1}$

(b) $6.6 \times 10^{-26} \text{ kg ms}^{-1}$

(c) $6.6 \times 10^{-23} \text{ kg ms}^{-1}$

(d) $6.6 \times 10^{-23} \text{ kg ms}^{-1}$

Q.145 A Balmer line is emitted when the electron in a hydrogen atom jumps from

(a) A higher orbit to the first orbit

(b) A higher orbit to the second orbit

(c) The first orbit to a higher orbit

(d) The second orbit to a higher orbit

Q.146 L_α x-rays is produced by transition from

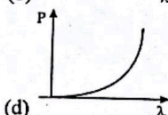
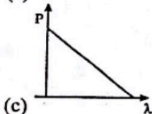
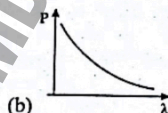
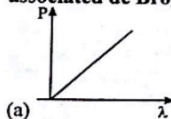
(a) $n=4$ to $n=1$

(b) $n=3$ to $n=1$

(c) $n=4$ to $n=2$

(d) $n=3$ to $n=2$

Q.147 Which of the following graphs represents the variation of particle momentum and the associated de Broglie wavelength?



Q.148 The half-life of radioactive substance is 5 min. The amount of substance in 20 min will be decayed?

(a) 93.75 %

(b) 75 %

(c) 25 %

(d) 6.25 %

Q.149 The half-life of two radioactive substance A and B are respectively 20 min and 40 min initially the sample of A and B have equal number of nuclei. After 80 min the ratio of remaining number of A and B nuclei is

(a) 1:16

(b) 1:4

(c) 1:1

(d) 4:1

Q.150 In which region of the electromagnetic spectrum does the Lyman series of hydrogen atom lie?

(a) Infrared

(b) Ultraviolet

(c) Visible

(d) X-rays

Q.151 What occurs in the decay of a radioactive nucleus?

(a) The nucleus absorbs another nucleus

(b) The nucleus absorbs at least one form of radiation

(c) The nucleus always splits into two equal fragments

(d) The nucleus emits at least one form of radiation

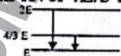


- Q.152 Which statement is true for all three types of radioactive emissions (alpha-particles, beta-particles and gamma-rays)?
 (a) They are completely absorbed by a thin aluminum sheet
 (b) They are deflected by electric fields
 (c) They emit light
 (d) They ionize gases
- Q.153 If a radioactive element has large value of decay constant, then in particular interval of time its atom will decay
 (a) Less
 (b) May be less or more depending upon physical conditions
 (c) More
 (d) Not predictable
- Q.154 Ratio of the speed of Lyman series photon to Balmer series photon is
 (a) equal to 1
 (b) Greater than 1
 (c) Less than 1
 (d) infinity
- Q.155 In an electronic transition, atom cannot emit
 (a) γ -rays
 (b) Infrared radiation
 (c) Visible light
 (d) Ultraviolet rays
- Q.156 Atomic spectra is observed due to transition of electron in
 (a) Atoms
 (b) Black body
 (c) Molecules
 (d) All of these
- Q.157 Which of the following transition will have highest emission wavelength?
 (a) $n=2$ to $n=1$
 (b) $n=2$ to $n=5$
 (c) $n=1$ to $n=2$
 (d) $n=5$ to $n=2$
- Q.158 Four lowest energy levels of H atom are shown in the figure. The number of possible emission lines would be



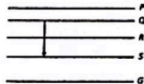
- (a) 3
 (b) 4
 (c) 5
 (d) 6

- Q.159 The following fig indicates the energy levels of a certain atom. When the system moves from $2E$ level to E a photon of wavelength λ is emitted. The wavelength of photon produced during its transition from level $4E/3$ to level E is.



- (a) $\frac{\lambda}{3}$
 (b) $\frac{3\lambda}{4}$
 (c) $\frac{4\lambda}{3}$
 (d)

- Q.160 Figure shows the energy levels P, Q, R, S and G of an atom where G is the ground state. A red line in the emission spectrum of the atom can be obtained by an energy level change from Q to S. A blue line can be obtained by following energy level change



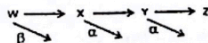
- (a) R to S
 (b) Q to R
 (c) R to G
 (d) P to Q

- Q.161 In spectrum of hydrogen atom, Paschen series is

- (a) $\frac{1}{\lambda} = R \left(\frac{1}{2^2} - \frac{1}{n^2} \right)$
 (b) $\frac{1}{\lambda} = R \left(\frac{1}{1^2} - \frac{1}{n^2} \right)$
 (c) $\frac{1}{\lambda} = R \left(\frac{1}{3^2} - \frac{1}{n^2} \right)$
 (d) $\frac{1}{\lambda} = R \left(\frac{1}{4^2} - \frac{1}{n^2} \right)$



- Q.162 The wavelength of last spectral line in Lyman series in of Rydberg constant is
(a) R (b) R^2
(c) $\frac{1}{R}$ (d) $\frac{1}{R^2}$
- Q.163 The frequency of a photon, having energy 100 eV is ($h=6.610^{-34} \text{ J-se}(b)$)
(a) $2.42 \times 10^{26} \text{ Hz}$ (b) $2.42 \times 10^{12} \text{ Hz}$
(c) $2.42 \times 10^{16} \text{ Hz}$ (d) $2.42 \times 10^9 \text{ Hz}$
- Q.164 Which light photon has the least momentum:
(a) Red (b) Blue
(c) Yellow (d) Green
- Q.165 The wavelength of electrons is _____ times shorter than those of visible light used in optical microscope
(a) 10 (b) 1000
(c) 100 (d) 10000
- Q.166 A three-dimensional image of remarkable quality can be achieved by modern versions called
(a) Scanning electron microscope (b) Scanning proton microscope
(c) Scanning electron telescope (d) Scanning electron spectrometer
- Q.167 In order to reduce the uncertainty in momentum, light of _____ wavelength is used
(a) Smaller (b) Larger
(c) Intermediate (d) Infinite
- Q.168 Neutron and proton are commonly known as _____
(a) Nucleon (b) Meson
(c) Boson (d) Quartz
- Q.169 Radioactivity is a _____
(I) Spontaneous activity (II) Chemical property
(III) Self disintegration property
Which of above statements is/are correct?
(a) I & II (b) II & III
(c) III & I (d) I, II & III
- Q.170 What are the values of a and z in the following nuclear reaction?
 ${}_2\text{He}^4 + {}_x\text{O}^{14} \longrightarrow {}_8\text{O}^a + {}_1\text{H}^1$
(a) 17, 7 (b) 7, 17
(c) 13, 6 (d) 6, 13
- Q.171 Number of electrons in the nucleus of ${}_{92}\text{U}^{235}$ are
(a) 235 (b) 92
(c) 91 (d) Zero
- Q.172 α , β and γ -rays from a radioactive source are passed through 0.5 mm thick aluminium sheet. The transmitted radiations consist of:
(a) α , β and γ -rays (b) β and γ rays
(c) γ -rays only (d) α -rays only
- Q.173 The phenomenon of radioactivity is associated with
(a) Fission of nuclei
(b) Emission of spectral lines
(c) Disintegration of neutrons
(d) Spontaneous disintegration of nucleolus of atoms
- Q.174 A radioactive isotope W decay to X which decay to Y and Y decays to Z as represented by the figure below.



What is the change in the atomic number from W to Z?

- (a) Increases by 3 (b) Decreases by 3
(c) Increases by 5 (d) Decreases by 5
- Q.175 Charge on β -particle is
(a) ± 1 (b) -1
(c) $+2$ (d) -2



- Q.176 Radioactive iodine can be used to check person's _____ is working properly
(a) Cancer (b) Skin cancer
(c) Lungs (d) Thyroid gland
- Q.177 cobalt-60 is used for treatment of
(a) Cancer (b) Kidneys
(c) Lungs (d) Thyroid
- Q.178 The gamma rays radiographs are used in
(a) Agriculture used (b) Medical diagnosis
(c) Support industry (d) All of these
- Q.179 The typical source of alpha particles is
(a) Radium-226 (b) Radium -222
(c) Radon-222 (d) Helium nuclei
- Q.180 A particle which has zero rest mass and non-zero energy and momentum must travel with a speed
(a) Equal to c, the speed of light in vacuum (b) Less than c
(c) Greater than c (d) Tending to infinity

ENGLISH

SPOT THE ERROR:

In the first type of sentences, some segments of each sentence are underlined. Your task is to identify that underlined segment of the sentence, which contains the mistake that needs to be corrected.

- Q.181 These kinds of people who have little education and their sole purpose is acquiring wealth are not the type I wish to associate with.
(a) (b) (c) (d)
- Q.182 The committee rejected the proposal for many reasons, the chief among which was the cost of borrowing the money.
(a) (b) (c) (d)
- Q.183 When Alexander left the Polytechnic, at sixteen, he was to take a job as clerk in a shipping firm in Leaden-Hall Street.
(a) (b) (c) (d)
- Q.184 Spelding rises, leads Kretton and Powers into next room, well-furnished study, many books and a globe of the world.
(c) (d) (a) (b)
- Q.185 She had not always pleaded for lenient; she urged severity where Chips was inclined to be forgiving.
(a) (b) (c) (d)
- Q.186 The term if widely accepted would have been the death sentence not only of the Ottoman Empire but of what was now correctly described as Turkey.
(a) (b) (c) (d)
- Q.187 For years, the landed gentries have striven to keep secret the payments they received from Europe.
(a) (b) (c) (d)
- Q.188 To whom shall I complain against yours brutality if I am to seek justice from your hand.
(a) (b) (c) (d)

CORRECTION:

In each of the following questions, four alternative sentences are given. Choose the CORRECT one and fill the Circle corresponding to that letter in the MCQ Response Form.

Q.189

- (a) As no one knows the truth as fully as him, no one but him can provide the testimony.
(b) As no one knows the truth as fully as he, no one but him can provide the testimony.
(c) As no one knows the truth as fully as he does, no one but he can provide the testimony.
(d) As no one knows the truth as fully as he does, no one but he alone can provide the testimony.



Q.190

- (a) Violence is the inevitable outcome of such a revolutionary change in society.
(b) Violence is the inevitable result of so a revolutionary change in society.
(c) The violence is the inevitable result of such a revolutionary change in society.
(d) Violence is inevitable result of such a revolutionary change in society.

Q.191 I want to write a poem. (Choose the correct Passive)

- (a) I want a poem to be written.
(b) A poem is wanted to be written by me.
(c) I want to write a poem. (No Passive)
(d) I am wanted to write a poem.

Q.192 Whom does he look for? (Choose the correct Passive)

- (a) By whom is he looked for whom?
(b) Who is looked for him?
(c) Who is looked for by him?
(d) He is looked for by whom?

Q.193 Look at the poll results; do they inspire hope? (Choose the correct Passive)

- (a) Let the poll results be looked is hope inspired by them?
(b) Let the polls results be looked at; is hope inspired by them?
(c) Let the poll results be looked at; has hope inspired by them?
(d) Let the poll results be looked at; is hope being inspired by them?

Q.194

- (a) If one group of people continues to get poorer while other group of people gets richer, we are creating situation which encourages poor to make war on the rich.
(b) If a group of people continues to get poorer while another group of people gets richer, we are creating a situation which encourages poors to make war on rich.
(c) If a group of people continues to get poorer while other group of people gets richer, we are creating situation which encourages the poors to make war on the rich.
(d) If one group of people continues to get poorer while another group of people gets richer, we are creating a situation which encourages the poor to make war on the rich.

Q.195

- (a) The child did not respond to the doctor's instruction because she was stubborn child.
(b) The child did not respond to the doctor's instructions because she was a stubborn child.
(c) The child did not respond to doctors' instruction because she was a stubborn child.
(d) The child did not respond to doctor's instructions because she was stubborn child.

Q.196

- (a) Most of the area had consisted of immense stretches of barren sand with a few water wells and the little vegetation.
(b) Most of the area had consisted of immense stretches of barren sand with the few water well and a little vegetation.
(c) Most of the area had consisted of immense stretches of barren sand with few water wells and little vegetation.
(d) Most of the area had consisted of immense stretches of barren sand with few water well and a little vegetation.

Sentence Completion:

Fill in the blanks with appropriate word.

Q.197 In the film, the killer's _____ of styling his victims' hair led the police to the salon where he worked.

- (a) Regret
(b) Urge
(c) Quirk
(d) Zest

Q.198 Often the pastures are _____ in mist, giving them a dreamlike equality.

- (a) Wafted
(b) Swathed
(c) Tangled
(d) Speckled

Synonyms

Choose the word that is most nearly **SIMILAR** in meaning to the word in capital letters.

Q.199 Tomfoolery

- (a) Sublimity
(b) Buffoonery
(c) Anonymity
(d) Freemasonry

Antonyms

Choose the word **OPPOSITE** in meaning to **CAPITALIZED** word given above.

Q.200 Stunt

- (a) Recede
(b) Sear
(c) Rear
(d) Impede

MCQ'S RESPONSE FORM

ID	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
40																
41																
42																
43																
44																
45																
46																
47																
48																
49																
50																
51																
52																
53																
54																
55																

Roll No.									
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

NAME: _____

FATHER'S NAME: _____

ROLL NO. (IN WORDS): _____

CANDIDATE'S SIGNATURE: _____

DEPUTY SUPDT. SIGN: _____

INSTRUCTIONS

- USE BLUE BALL POINT PEN ONLY.
- PLEASE FILL IN THE ROLL NO. CORRECTLY.
- IT IS IMPORTANT THAT THE CIRCLE IS FILLED COMPLETELY AND CORRECTLY AS SHOWN IN THE EXAMPLE BELOW, OTHERWISE THE UNIVERSITY CAN NOT BE HELD RESPONSIBLE.

CORRECT EXAMPLE: ○ ● ○ ○ ✓

INCORRECT EXAMPLES: ○ ● ○ ○ X
○ ○ ○ ○ X
○ ○ ○ ○ X

- DO NOT ERASE A RESPONSE ONCE THE CIRCLE HAS BEEN FILLED IN.
- INCOMPLETELY FILLED CIRCLES WILL NOT BE READ.
- MULTIPLE RESPONSE TO ONE QUESTION IS NOT ALLOWED.
- TEARING OFF THE RESPONSE FORM, FOLDING, STAPLING, CUTTING & PUTTING UNNECESSARY SIGNS AND IDENTIFICATION ON THE FORM WILL LEAD TO AUTOMATIC DISQUALIFICATION OF THE CANDIDATE.

THE UNIVERSITY SHALL NOT BE HELD RESPONSIBLE IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED.